

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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## INTRODUCTION.

The REVIEW for October, 1896, is based on 2,735 reports from stations occupied by regular and voluntary observers, classified as follows: 140 from Weather Bureau stations; 33 from U. S. Army post surgeons; 2,421 from voluntary observers; 33 from Canadian stations; 1 from Hawaii; 96 received through the Southern Pacific Railway Company; 14 from U. S. Life-Saving stations. International simultaneous observations are received from a few stations and used together with trustworthy newspaper extracts and special reports.

The WEATHER REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the Editor, but the statistical tables are furnished by Mr. A. J. Henry, Chief of the Division of Records and Meteorological Data. Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada, Mr. Curtis J. Lyons, Meteorologist to the Government Survey, Honolulu, and of Dr. Mariano Bárcena, Director of the Central Meteorological Observatory of Mexico.

## CLIMATOLOGY OF THE MONTH.

### GENERAL CHARACTERISTICS.

The principal storm of the month was the hurricane that moved slowly northward from the West Indies on the 9th to the coast of New England on the 15th, but which was not felt severely at any interior land stations. Another interesting storm passed from the west Gulf States on October 23, rapidly northeastward, attended by general rain. The storm that passed from Kansas, October 28, to Lake Superior, October 31, was the only one that brought high winds to the Lake Region. In general the month was rather above the average as to pleasant autumn weather. The temperature was decidedly below the average from the Rocky Mountains to the Atlantic Coast, although there were a few days on which high maximum temperatures occurred in the immediate Mississippi and Missouri valleys. Rainfall was below the normal in the South Atlantic and east Gulf States, and lower Lake Region, but above the average in the west Gulf States. The snowfall on the northern Slope and middle Plateau regions was above the normal for the month.

### ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart IV. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The mean pressures during the current month were high in the Middle Atlantic States, Manitoba, and the Dakotas. Pressures were low in the Pacific Coast States.

The highest pressures were: Lander, 30.13; Parkersburg and Lynchburg, 30.11; Cincinnati, Pittsburg, Knoxville, and Cheyenne, 30.10. The lowest were: Yuma, 29.83; Fresno,

29.91; Los Angeles, 29.92; Red Bluff and Prince Albert, 29.93; San Diego, 29.94.

As compared with the normal for October, the mean pressure was in excess over all the Canadian Provinces and the lower Lake Region. It was deficient in the Pacific Coast States.

The greatest excesses were: St. Johns, N. F., 0.18; Qu'Appelle, 0.10; Minnedosa, 0.09; Bismarck, 0.08; Father Point and Sydney, 0.07; Halifax, Chatham, and Williston, 0.06. The greatest deficits were: Roseburg, 0.09; Block Island, Yuma, and Red Bluff, 0.08; Fresno and Vicksburg, 0.07; Nantucket, Atlanta, and Los Angeles, 0.06.

As compared with the preceding month of September, the pressures reduced to sea level show a rise at all stations except the coast of Washington, and the coast of New England and the Canadian Provinces.

The greatest rises were: Minnedosa, 0.12; Idaho Falls, 1.11; Winnipeg and Winnemucca, 0.10; White River, Qu'Appelle, Lander and El Paso, 0.09. The greatest falls were: St. Johns, N. F., 0.10; Bermuda, 0.07; Yarmouth, 0.06; Halifax, 0.05.

### AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

During the month the paths of ten high and nine low areas were sufficiently well marked to be traced upon Charts II and I at the end of this REVIEW. From p. m. of the 3d to a. m. of the 10th there was a subpermanent low area in western Arizona. The path of low No. IX could be followed for only twenty-four hours, and for this reason no data have been inserted for it. The principal characteristics of the movements of these highs and lows will be found in the table accompanying, and a few of the more important details are here given.

### HIGHS.

There has been a rather remarkable tendency for highs to

disappear in the central portion of the country between the Rockies and the Mississippi Valley. Highs III, IV, V, IX, and X are in this category. Nos. I, II, VI, VII, and VIII reached the Atlantic. Highs II, IV, VIII, and X came from the Pacific Coast; III, VII, and IX from north of Montana, and I, V, and VI began in the central portion of the country. The general motion of the highs that crossed the country has been along the latitude of 35°, the temperature departures have been, in general, below the normal. This would seem to indicate that a tendency to higher temperature from southerly winds has been more than overcome by a radiation to clear skies.

#### LOWS.

Most of the storms of the month have been first seen to the north of Montana. Their paths have been along northerly latitudes, and they have disappeared in the Lake Region or else in the Gulf of St. Lawrence. The West India hurricane of October 9th to 17th was IV on Chart I. Its ocean path has been mapped by the Hydrographic Office. From the 13th to 16th this storm remained almost stationary off the middle Atlantic Coast. The highest winds were reported as follows: Cape Henry, 60 miles, p. m. of 10th and 11th. Block Island, 68, p. m., 11th; 73, a. m., 12th; 80, p. m., 12th. Boston, 52, p. m., 12th.

At 8 p. m. of 28th a storm was central off the north Pacific Coast and this marked a break in the rather uniform dry weather which had prevailed previously. During the preceding twenty-eight days rain (mostly light and sporadic) had occurred on only six days. During the nineteen days following, up to November 16, rain (oftentimes very heavy) fell on all but two of the days. The remarks by Mr. B. S. Pagne, the official at Portland, Oreg., relative to this occurrence, are published on a later page of this REVIEW.

#### Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
<b>High areas.</b>							<i>Miles.</i>	<i>Days.</i>	<i>Miles.</i>	<i>Miles.</i>
I.....	1, a. m.	45	90	5, p. m.	51	68	1,130	4.5	251	10.5
II.....	2, a. m.	42	125	13, a. m.	49	83	4,220	11.0	384	16.0
III.....	8, p. m.	51	118	11, a. m.	49	89	1,880	2.5	753	31.4
IV.....	11, a. m.	41	126	14, a. m.	46	96	1,890	3.0	630	26.2
V.....	14, a. m.	43	111	17, a. m.	51	105	910	3.0	304	12.7
VI.....	17, a. m.	41	101	21, a. m.	46	58	2,820	4.0	705	29.4
VII.....	19, a. m.	46	109	23, a. m.	38	72	2,540	4.0	626	26.1
VIII.....	20, p. m.	43	137	27, a. m.	39	73	4,640	6.5	714	29.8
IX.....	27, a. m.	52	106	29, p. m.	51	102	660	2.5	264	11.0
X.....	29, p. m.	37	125	31, p. m.	33	102	1,840	3.0	613	25.5
<b>Sums.....</b>							22,530	44.0	5,244	
<b>Mean of 10 paths.....</b>									524	21.9
<b>Mean of 44 days.....</b>									512	21.3
<b>Low areas.</b>										
I.....	2, a. m.	53	116	5, a. m.	47	87	2,060	3.0	687	28.6
II.....	5, p. m.	38	91	8, p. m.	50	62	1,690	3.0	563	23.5
III.....	8, a. m.	42	113	12, a. m.	36	85	1,960	4.0	498	20.7
IV.....	9, a. m.	27	77	17, a. m.	51	64	2,900	8.0	363	15.1
V.....	9, p. m.	54	119	11, p. m.	53	105	600	2.0	303	12.6
VI.....	13, p. m.	54	107	15, p. m.	46	78	1,460	2.0	732	30.5
VII.....	17, p. m.	51	117	22, a. m.	51	66	2,830	4.5	629	26.2
VIII.....	22, a. m.	47	90	25, a. m.	48	62	1,550	3.0	516	25.1
IX.....	23, p. m.	30	98	23, p. m.	34	96				
X.....	26, a. m.	44	120	31, p. m.	48	87	2,980	5.5	541	22.5
<b>Sums.....</b>							18,060	35.0	4,832	
<b>Mean of 9 paths.....</b>									537	24.4
<b>Mean of 35 days.....</b>									516	21.5

#### TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and

the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean temperature* of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* were: Key West, 79.8; Jupiter, 76.0; Yuma, 75.5; Tampa, 73.2; Port Eads, 72.9; Galveston, 71.4; Corpus Christi, 70.8. The lowest temperatures were: Moorhead, 41.1; Williston, 41.2; Duluth, 41.8; Sault Ste Marie, 41.9; Bismarck, 42.0. Among the Canadian stations the highest were: Sydney and Halifax, 49.2; Yarmouth, 48.6; St. Johns, N. F., 48.2; Charlottetown, 48.0. The lowest were: White River, 31.6; Minnedosa, 34.5; Prince Albert, 34.6; Qu' Appelle, 34.8; Winnipeg, 35.0.

As compared with the normal for October the mean temperature for the current month was in excess at most of the Rocky Mountain and Pacific Coast stations and also the Canadian Maritime Provinces. It was deficient throughout the intermediate country. The greatest excesses were: Red Bluff, 4.2; Salt Lake City, Sidney, and Halifax, 3.2; Winnemucca, 3.1; Yuma, 3.0. The greatest deficits were: Detroit and Pittsburgh, 4.7; Sioux City, 4.6; White River, 4.4; Kittyhawk, 4.2; New York and Cleveland, 4.1.

Considered by districts the mean temperatures of the current month show departures from the normal as given in Table I. The greatest positive departures were: Middle Plateau, 2.4; northern Plateau, 1.4. The greatest negative departures were: Middle Atlantic, 3.0; lower Lake, 3.5.

The *years of highest and lowest mean temperatures* for October are shown in Table I of the REVIEW for October, 1894. The mean temperature for the current month was not the highest on record at any regular station of the Weather Bureau. It was the lowest on record only at Sioux City, 47.1.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: 102, Yuma (18th); 98, San Luis Obispo (2d) and Phoenix (6th); 94, Fresno (2d) and Red Bluff (5th); 92, Palestine (3d). The lowest maxima were: 59, Eastport (16th); 60, Tatoosh Island (frequently); 64, Northfield (30th); 65, Alpena (30th), Sault Ste. Marie and Marquette (4th); 66, Port Angeles (17th). The highest minima were: 71, Key West (16th); 58, Jupiter (16th), Port Eads (frequently), Galveston (8th); 56, Tampa (16th) and Corpus Christi (25th). The lowest minima were: 10, Williston (22) and Lander (29th); 13, Bismarck (20th) and Huron (22d); 15, Moorhead (21st); 16, Miles City (29th); 17, Havre (26th); 18, Pierre (20th); 19, Duluth (24th) and Idaho Falls (10th).

The *years of highest maximum and lowest minimum temperatures* are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record at: New Orleans, Little Rock, and Topeka, 91; Miles City, 86; Port Angeles, 66. The minimum temperatures were not the lowest on record at any station of the Weather Bureau.

The greatest daily range of temperature and the data for com-